DOCUMENT RESUME

ED 092 850 CG 009 009

AUTHOR Althoff, Michael E.
TITLE The Development of a Test to Assess Drug Using Behavior.
PUB DATE Oct 72
NOTE 28p.
AVAILABLE FROM Department of Psychology, Southern Illinois University, Carbondale, Illinois 62901

EDRS PRICE MF-$0.75 HC-$1.85 PLUS POSTAGE
DESCRIPTORS Attitudes; *Behavior Patterns; *College Students; *Drug Abuse; *Research Projects; *Test Construction

ABSTRACT

The objective of the study was to develop a test which could measure both the qualitative and quantitative aspects of drug-using behavior, including such factors as attitudes toward drugs, experience with drugs, and knowledge about drugs. The Drug Use Scale was developed containing 134 items and dealing with five classes of drugs: marijuana, hallucinogens, stimulants, depressants, and opiates. Study subjects were male and female college students. Results of the assessment showed a positive relationship between attitudes, experience, and knowledge subtests. Drug users obtained higher knowledge scores than did nonusers, and showed more positive attitudes toward drugs. The study concludes that the Drug Use Scale is reliable. (Author/EK)

U S DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

PERMISSION TO REPRODUCE THIS COPYRIGHTED MATERIAL HAS BEEN GRANTED BY
MICHAEL ALTHOFF
TO ERIC AND ORGANIZATIONS OPERATING UNDER AGREEMENTS WITH THE NATIONAL INSTITUTE OF EDUCATION. FURTHER REPRODUCTION OUTSIDE THE ERIC SYSTEM REQUIRES PERMISSION OF THE COPYRIGHT OWNER

ED 092850

CG 009 009

ber 16, 1972

The Development of a Test to Assess Drug-Using Behavior[1]

Michael E. Althoff[2]

Southern Illinois University

In the last decade there has been an ever increasing number of publications reporting on college students' use of illicit drugs and the many issues associated with this phenomenon. A number of investigators interested in characteristics of college drug users have compared drug users and non-users on various psychological tests and personality variables (e.g., McGlothlin & Cohen, 1965; Allen & West, 1968; Blum et al, 1969). In these studies more often than not, little attention is paid to both the conceptual problem of the definition of drug use and to the problem of data collection--how drug use is measured.

Modell (1967) defines a drug as "any substance that by its chemical nature alters structure of function of the living organism (p. 346)." By this definition the single administration of a single drug would imply drug use. However, such a simplistic definition does not deal with the many qualitative and quantitative aspects of drug use. Presumably, drug users are not homogeneous with respect to the frequency and variety of illicit drugs which they consume, not to mention their beliefs about drugs, onset of drug use, plans for future use, attitudes toward legal control of these agents, and familiarity with subcultural aspects of drug use.

A survey (Althoff, 1971) procedures of data collection used by investigators studying characteristics of drug users revealed that clinical observation is the most frequently used method. Other researchers relied upon psychological testing of drug users. Although the sensitivity and skill of the interviewer and the soundness of the test which was used are important, an equally important and little studied aspect is the measurement

of drug use *per se*. Typically, self-report is relied upon for assessing drug use. Also a number of individuals have constructed survey instruments to measure behavior associated with drug use. However, the validity of self-report may only be presumptive and frequently no information is reported on the reliability or validity of the survey instruments.

The purpose of the present investigation was to construct a measure which deals with many of the qualitative and quantitative aspects of drug use, which would serve as an operational definition of drug use, and to estimate its reliability and validity. Such a measure which attends to many of the features of drug-using behavior would allow investigators to explore drug use with full acknowledgment of its many complexities while using a reliable method of data collection. The social phenomenon of drug-using behavior was analyzed in terms of its affective (attitudes toward drug use and related issues), behavioral (experience with drug use), and cognitive (knowledge about drugs) components. Procedures for item selection are described, reliability and validity data are reported and potential uses for the scale were outlined.

Method

Subjects

A total of 302 S's, 155 male and 147 female, were solicited from an introductory psychology course at Southern Illinois University, Carbondale, Illinois. The majority of these S's were sophomores and 19 years of age.

Instrument*

One-hundred and thirty-four items were selected to measure an individual's attitudes toward, experience with, and knowledge about drugs. The above three domains were chosen to reflect drug-using behavior, to

serve as an operational definition of this construct, and comprise the three subtests of the Drug Use Scale (DUS). The scale samples information about five distinct classes of drugs which are believed to be frequently illicitly used by many individuals. These classes are: marijuana and hashish; hallucinogens e.g., amphetamines, dexedrine, benzedrine, etc.; depressants e.g., barbiturates and tranquilizers; and opiates e.g., heroin, morphine, etc.

Selection of attitude items. Sixty-one items were generated from the following five content areas: control or regulation of drug use; moral-philosophical aspects of drug use; effects of drugs on the individual or on society; stereotypes associated with the drug user; drug user views of the establishment. Half of these items were worded in a pro-drug use direction while the other half were worded in a negative direction. Two formats were used around which these items were constructed. The first format consisted of a statement about drug use which the respondent rated as it referred to each of the five above mentioned classes of drugs. A six-point numerical rating scale ranging from "strongly agree" to "strongly disagree" was used. Thirty-six items were constructed using this first format. These items were designated as "Part 1" of the Attitude subtest. Examples of these items are:

> The use of _____ make(s) one more aware of the pervasiveness of hypocrisy in our society.
>
> Using _____ lead(s) to serious mental illness.

The second type of item format consisted of statements which, for the most part, indirectly referred to the use of drugs. The respondent endorsed these items again using a six-point numerical rating scale. Twenty-five

items were constructed using this format and were designated as "Part 2' of the Attitude subtest. Examples of these items follow:

> Pleasure which is obtained without hard work is not right.
>
> Long established attitudes toward drug usage should be vehemently challenged.

Selection of experience items. Items were selected to assess an individual's variety, nature, and extent of drug use. Seventeen items, designated in the subsequent analysis as "Variety", request the respondent to indicate his use or nonuse of 17 different drugs by responding "Yes" or "No" with reference to each drug. Seven items were selected to assess the nature and extent of an individual's use of drugs within each of the five classes of drugs. The first four items inquired about the respondent's lifetime use of drugs, his onset of drug use, when he last used the drug, and his plans for future drug use. These items were taken from Eells' (1968) questionnaire and were designated as "Nature" in the subsequent analysis. The last three items, designated as "Extent" in the subsequent analysis, requested the testee to indicate the number of times he used the drugs during the last week, last month, and last six months.

Selection of knowledge items. A total of 48 four-alternative, multiple choice items were constructed to assess knowledge of the five classes of drugs. Twenty-four of them were concerned with physical and psychological effects of these drugs, their pharmacological nature, and their medical uses. The remaining 24 items dealt with knowledge of drugs most likely to be acquired through association with the "drug subculture," i.e., drug slang, procurement of drugs, modes of administration, etc. Considerable care was taken to ensure that these slang terms were those used on a national level. The first 24 items in the subsequent analysis were designated as "Factual Knowledge" and the remaining 24 items were labeled as "Social Knowledge."

Procedure

Administration

The scale was administered during Fall, 1970, to an initial sample of 98 male and 100 female S's and was administered also during Winter, 1971, on two occasions separated by a two week interval, to 57 male and 47 female S's. The data from the Fall administration was analyzed and items were selected for the final version of the DUS. Although the test was administered in the same form during Winter, 1971, it was scored only for items retained after item analysis. All data was scored and analyzed through the use of a computer program designed by Gronek and Tyler (1970).

Analysis of Items

A pre-data analysis, explicated by Tyler (1965), involved the employment of the interview technique whereby six individuals, three of them drug users and three of them nonusers, were asked to read a test item aloud, to respond aloud, and then to report all intervening thoughts. Data gathered from these interviews were used to refine items and instructions.

The post-data analysis involved the computation of the correlation between each item and the subtest in which it was contained. The frequency of endorsement of each item and the mean response on each item were computed and the percent of S's passing each knowledge item was obtained. Finally, criteria were established regarding the minimal item-subtest correlation necessary for inclusion of an item in the final version of the scale.

Determination of Reliability

The stability of the test over time was determined by administering the scale during Winter, 1971, to a group of 104 S's (57 males and 47 females) on two occasions separated by a period of two weeks. A homogeneity

analysis, similar to the analysis of variance, in which the observed variance is divided between items, persons, and error was performed. Cronbach's alpha (Rtt) an index of the average correlation between items, was calculated for each subtest and subtest part. Corresponding coefficients for items and for persons were also obtained. Rtt was stepped down by the Spearman-Brown formula to obtain an index of the average intercorrelation between items (Rii). The dual of alpha for persons was produced and stepped down to produce an index of the average intercorrelation between subjects (Rpp).

Guilford (1954) first introduced Rii and Fiske (1963) has further explored these indices. Rii may be viewed informally as an index of the degree to which items agree in their ordering of people, or as an average inter-item correlation. Rpp, parallel to Rii, can be viewed informally as an index of the degree to which persons agree in their ordering of items, as an index of the degree to which persons "spread" the items out on the continuum.

Like many other constructs, the construct of drug-using behavior is a broad and heterogeneous one. Fiske's (1963) indices were developed to assess the substantive homogeneity of a test over items and over people. The substantive homogeneity of a test refers to the extent to which the test scores reflect a unitary conceptual entity. It is maximal when the same response tendency is measured by the several items in each of the subjects.

Estimation of Validity

The following operations were performed to estimate the validity of the scale:

1. In order to determine the degree of commonality among subtests multiple correlations between scores on the three subtests and parts of these subtests were computed.

2. In order to discover the degree to which the scale discriminates between users and nonusers a comparison, using multiple t-tests, of mean scores on all parts of the scale was obtained. In addition, t values were converted into point-biserial correlation coefficients.

3. Information regarding the scale's content validity was gathered through comparisons of mean scores on Attitude, Part 1, for each of the five classes of drugs. Also, the frequency in which the five classes of drugs were used during the last week, last month, and last six months was noted.

Cross-validation was accomplished through two methods. During Fall, 1970, items were selected on the basis of data collected through testing 100 female subjects and then items were selected on the basis of data collected through the administration of the scale of 98 male subjects. A comparison of validity coefficients obtained from the responses of these two samples and the extent to which the same items were retained in both item selection procedures was noted.

During Winter, 1971, items were again selected on the basis of data collected from the administration of the scale to 104 subjects. This administration also comprised the first of the two administrations of the scale to assess its stability over time. For the second cross-validation validity coefficients obtained during the Winter administration were compared to those computed for the first cross-validation. Also the degree to which the same items were retained in both item selection procedures was noted.

Results

Item Analysis

Pre-data item analysis. Pre-data analysis of items yielded information about the manner in which the items were presented i.e., the instructions

and the ease in which responses were given to items, and information regarding item content. The suggestion from subjects used in this analysis were implemented prior to group administration of the scale. Changes were made which made the instructions and the items clearer.

Post-data item analysis.* Corrected correlations of each item with the subtest in which it was contained were computed. Attitude subtest items were deleted which failed to achieve a correlation of .40. Thirty-one of these items were retained which achieved correlations ranging from .40 to .73 (md. r = .56). No criteria was established for Experience items since the magnitude of the correlations may have simply reflected the frequency in which any given drug was used. Also deletion of these items would have resulted in the loss of information regarding the type and nature of the drugs used. These items achieved correlations ranging from .20 to .56 (md. r = .37). For analysis of Knowledge items both the item-subtest correlations and the P values were noted. Here the criteria for item retention was a coefficient of .20. Also an attempt was made to retain items which comprised an approximately even distribution of P values. Twenty-one items were retained which achieved correlations ranging from .17 to .58 (md. r = .34). The P values for these items ranged from .25 to .86 ($\bar{x}$ = .58).

Reliability of the Scale

As is indicated in Table 1. test-retest correlations ranged from .75

Insert Table 1. about here

(Extent) to .98 (Variety). The median for these coefficients was .88. Values of Rtt ranged from .51 (Nature) to .98 (Attitudes and Attitudes,

Part 1). The median of the coefficients was .88. Rpp values ranged from .07 (Extent and Experience) to .34 (Attitudes), the median being .16. Rii coefficients ranged from .02 (Experience) to .65 (Nature) and the median values of these coefficients was .32.

Validity of the Scale

Table 2. presents the correlations between subtests and subtest parts.

Insert Table 2. about here

All of these coefficients were significant at the .01 level, with the exception of Factual Knowledge with Experience and with Extent of drug use which reached significance at only the .05 level.

Point-biserial correlations between the dichotomous variable of drug use and nonuse and each of the three subtests and their parts are presented in Table 3. These coefficients ranged from .21 (Factual Knowledge)

Insert Table 3. about here

---

to .69 (Attitudes, Part 2) and their median value was .46. These coefficients were calculated from values of t reflecting the difference between the means of users' and nonusers' scores on the DUS. All of these values were significant at the .01 level with the exception of Factual Knowledge which reached significance at the .05 level.

Part 1 of the Attitude subtest was divided with respect to the five classes of drugs. The mean score and its standard deviation as they refer to each of the five classes of drugs are presented in Table 4.

Insert Table 4. about here

Male drug users expressed attitudes toward the five classes of drugs which led to the following ranking according to favorableness of attitudes: marijuana, hallucinogens, stimulants, depressants, and opiates. For the other three groups of S's the drug classes were ranked as follows: marijuana, stimulants, hallucinogens, depressants, and opiates.

Drug users indicated that marijuana was the drug most frequently used; however, males differed from females in their ranking of the frequency of the use of these drugs.

After both cross-validations nine Attitude and nine Knowledge items failed to consistently achieve an appropriately high item-subtest correlation and were deleted from further analysis.

Discussion

Item Selection

Since it was assumed that drug usage is a complex phenomena, items were selected to sample many different kinds of information. Attitude items were generated from content areas and experience items were constructed not only to assess incidence of drug use but also the variety, the nature and the extent of drug usage. Also ability items inquire about both factual and social kinds of drug knowledge. The scale not only deals with the most popular illicitly used drug, marijuana, but with four additional classes of drugs. More recent approaches to drug education and legislation reflect the important differences between the effects of these various substances.

To be sure, the formal pre-data item analysis was a most sensible approach. Besides being most useful in making sure that the instructions and format were clear, this analysis was most sensitive to the various ways

in which S's view items. This facilitated the development of precise items making it less likely that responses would be affected by unknown sources of error.

Although there are no strict rules regarding how great in magnitude an item's correlation with the scale in which it is contained should be, it is clear that this criterion of strictness for item selection influences the resulting degree of test homogeneity. As explained earlier items in the Experience subtest were not amenable to the application of such a criterion; however, the criterion for the retention of an attitude item was quite high and that used for selection of ability items was one generally suggested by Nunnally (1967).

Reliability

Although the test-retest (t-r) method for determining reliability has been considered to have serious defects, with few exceptions the t-r coefficients obtained for each subtest and subtest part are adequate. Since the Extent part of the Experience subtest was the least structured part of the scale it subsequently achieved the lowest reliability coefficient. This may also reflect the stability of the behavior being measured. That is, the frequency of drug usage varies over time and is influenced by the availability of drugs and other factors. For example, a cycle of the use of stimulants and depressants may be substituted by an individual for the use of marijuana and a hallucinogen. Or, one week an individual may be socializing with others who have access to depressants whereas the next week he may interact with individuals who have a large quantity of hashish. Similarly there is no reason to believe that the frequency of the use of one drug is in any way related to the number of times another drug is used.

Since the Experience subtest is composed of three types of items both dichotomously and continuously scored and items ranging in score from 0 to 999 it elicits three numerically different types of responses. The resulting reliability coefficient which is partly dependent on correlations among items within a test reflects an interaction between three different types of items. Also the score on Extent is at least three times greater than the scores on Variety and Nature. Thus, most of the variance of the Experience subtest is produced by one of its parts, Extent. Items comprising the Variety and Nature subtest parts appear most stable over time probably because they inquire in a most general manner about drug experience. Finally, one would expect to get better predictions from decisions based on attitude items than for those based on knowledge items.

With few exceptions the various subtests and their parts possess a high degree of homogeneity. The relatively lower values of Rtt for Experience and Extent are appropriate and predictable since their items are very heterogeneous in nature. Both Factual and Social knowledge items have values of Rtt which fall below .80, a lower limit for reliability suggested by Anastasi (1968). However, Nunnally (1967) suggests that the satisfactory level of reliability depends on how the measure is used. Nunnally indicates that instruments used in basic research may only need to possess modest reliabilities such as .60 or .50. Therefore, applied decisions requiring a greater degree of reliability which are based on the Knowledge subtest scores should be made cautiously.

Concerning the other measure of homogeneity, Rii and Rpp, Fiske (1966) has indicated that with dichotomously scored items the ideal values of Rii and Rpp are .33 and for continuously scored items the ideal values

of these indices would approach .50. Fiske calculated these indices for 22 psychological tests, including the Edwards Personal Preference Schedule, the California Psychological Inventory, the Holtzman Inkblot test, etc. When the tests studied contained two or more scales he presented those which achieved the highest and lowest proportional remainder variance. These indices for dichotomously scored items ranged from .03 to .23 (md. = .09) and from .07 to .54 (md. = .20) for Rii and Rpp respectively. For continuously scored items these indices ranged from .07 to .59 (md. = .13) for Rii and from .12 to .37 (md. = .24) for Rpp.

The dichotomously scored items appear in the Variety part of the Experience subtest and in the Knowledge subtest. For Variety Rii and Rpp very closely approximate the ideal which Fiske suggests. However, these indices calculated for the Knowledge subtest and its two parts more closely approximate the median of the indices which Fiske calculated.

It is interesting that for Factual Knowledge items there is a tendency for them taken together to "spread" people out less efficiently than the degree to which persons "spread" the items out on the continuum. This trend is reversed for Social Knowledge items. It would appear, therefore, that the Factual Knowledge items elicit a less consistent pattern of responses from subjects than do the Social Knowledge items. This difference may be reflective of the difference in content of these two types of knowledge items; however, it is difficult to interpret this finding because, at present, not many of the propositions concerning the interpretive significance of Rii and Rpp have been systematically tested. It therefore may be appropriate to deal with the discussion of these indices in a descriptive fashion.

The Attitude subtest and its parts have values of Rii and Rpp which by far surpass the median value of the coefficients for the continuously scored tests reported by Fiske. Similarly the Nature part of the Experience subtest to a great extent approximates the ideal case. It is noteworthy that the value of Rii is extremely high for this group of items. The ideal value of Rii is approached as the distribution of item frequencies approximate a rectangular distribution. A value of .65 for Rii would suggest that the distribution approaches a bimodal one. In contrast, the Extent items of the Experience subtest have low values of both Rii and Rpp. Since the Experience subtest contains items which are both continuously and dichotomously scored the values of Rii and Rpp in this case have an unclear meaning. Except for Extent of drug use it seems that the continuously scored subtests and their parts both, to an extent much greater than the majority of tests which Fiske examined, possess relatively higher inter-item and inter-person correlations.

Fiske (1966) pointed out that the adequacy of a test, in reference to Rii and Rpp, is a direct function of the structuring which is established for the subject by the instructions and by the situation. Therefore, the lack of structure of the Extent part of the Experience subtest, relative to the other subtests and their parts, may explain why Rii and Rpp were much lower.

In addition, the values of Rii and Rpp were calculated for the original 176 item version of the DUS. With the exception of the Experience subtest which had no items deleted from it the values of Rii increased for all subtests and their parts after inadequate items were deleted. Besides indicating that the criteria used for selecting adequate items was efficient, these increases in the values of Rii indicate that the scale is more internally

consistent in this shorter form. In contrast, the values of Rpp remained relatively unchanged for Attitude items, and decreased for Knowledge items. Thus, the extent to which subjects are producing the same pattern of responses to items was unaltered by reducing the Attitude subtest's length. However, it appears that subjects are less consistent in their ordering of items after inadequate items were deleted.

Validity

At the present stage of the development of this measurement device only the internal validity was explored. That is, no attempt was made to determine the relationship of the DUS with a criterion variable independent of information assessed by the scale itself. Although the relation between the criterion variable of use or nonuse of drugs and the subtest parts of the scale was assessed, this criterion variable was based on responses to the Experience subtest. The usefulness of the total test score is thus not presently known and it follows that the relationship of the subtests to the total score has little meaning at the present time.

Relationships Within Subtests

Part 1 of the Attitude subtest correlated .99 with this subtest. This is not surprising since 21 items of this 21 item subtest comprise Part 1, and because of the scoring system which increased the variance of the 21 items proportionally over each of the five classes of drugs. For this reason this coefficient is spuriously high and therefore one can only comment on the relationship among subtest parts. There is a very high relationship between the two parts of this subtest, which suggests that they are measuring essentially the same thing--ostensibly attitudes toward drug usage--even though Part 1 contains items referring mostly to drugs in general.

Relationships among the Variety, Nature, and Extent parts of the Experience subtest are also very high. On the other hand Nature, a more gross estimate of an individual's pattern of drug use, relates less highly with Extent, a more precise measure of an individual's pattern of drug use, than does Variety. Similarly Social Knowledge relates very highly with Factual Knowledge.

All of these coefficients are significant ($p > .01$) and, in general it appears that the divisions within each of the three subtests relate highly with one another.

Relationships Among Subtests and Subtest Parts

Since there are no strict rules, beyond level of significance regarding how high a correlation should be, let us rank order these 38 r's, divide them into three groups, the first two groups containing 13 r's each and the remaining group containing 12 of these r's and label them "low" (.15 to .35), "moderate (.36 to .49), and "high" (.51 to .89), respectively.

A number of findings are now more clearly illustrated. The correlations between Extent and all other nonexperience subtests and parts consistently fall in the "low" category. This would seem to indicate that the frequency in which an individual reports using a drug is not as highly correlated with his attitudes toward drugs nor his knowledge of drugs as are the variety of drugs he reports having used and the nature of his drug use. Similarly, a person's factual knowledge regarding drugs is not as highly related to his attitudes toward drug use and his experience with using drugs as is his knowledge of social aspects of drug use.

Also, although Experience and Knowledge subtests and subtest parts all relate approximately the same with the Attitude subtests and its parts,

their relationship with each other is not quite as strong. This finding is similar to that found using an earlier and much shorter version of the present instrument (Althoff, 1968). Correlations between Attitude and Experience items were .59 in contrast to an Attitude with Knowledge r of .33 and an Experience with Knowledge r of .29.

It would appear that both the Extent and Factual Knowledge subtests parts are measuring something different than are the other subtest parts of the Experience and Knowledge subtests. Also, in general, the Knowledge subtest is measuring something different than the Experience subtest is measuring.

Relationship Between Drug Use and Nonu and the DUS

All values of t were significant at the .05 level and, in addition, all were significant at the .01 level with the exception of Factual Knowledge. Identical findings concerning level of significance for point-biserial correlations were found. These findings suggest that the test does significantly discriminate between drug users and nonusers. Attitude items referring to marijuana discriminated between drug users and nonusers to a much greater degree than did attitude items referring to opiates. One would expect that drug users and nonusers share more common beliefs about the opiates but differ more in their beliefs about marijuana. Similarly, Social Knowledge accounted for four times as much variance as did the Factual Knowledge subtest. It seems that factual knowledge of drugs is more easily acquired than is social knowledge which may require first hand experience with drug use.

Content Validity of the DUS

It would seem that the DUS has a representative content of items. The World Health Organization (Eddy et al, 1965) defines seven different types of drug dependence. With the exception of alcohol all of these types of drugs were included in one of the five classes of drugs which were represented in all three subtests of the DUS. In the final form of the scale stimulant items were included in Social Knowledge, but deleted from Factual Knowledge. In general, the Social Knowledge items were more representative of all five classes of drugs than was Factual Knowledge. Thus the Factual Knowledge items have lower correlations with the other subtests and their parts.

There are several aspects of knowledge regarding drugs which the present study did not consider. Since the drug classes were defined for the subjects by example, several questions concerned with the names of drugs and their classification were not included in the scale. Knowledge regarding causes of drug use, adverse effects, including overdose of drugs, and detection of their use were not assessed.

Both drug users and nonusers reported more favorable attitudes toward marijuana than toward the other drugs. Also they reported attitudes which were least favorable toward the opiates.

The following frequency of use of the five classes of drugs was found: marijuana was used most frequently, followed by the stimulants, depressants, hallucinogens, and the opiates. Item 79 reflecting lifetime usage of drugs (10 or more times during lifetime) yielded a slightly different order, for the ranking of the hallucinogens and depressants were reversed. During the last six months (item 85) marijuana was used

most frequently followed by the stimulants, hallucinogens, depressants, and opiates. These findings did not agree with the reports of Berg (1970) and Barter (1969). These discrepancies may reflect sampling differences. In the present study subjects were solicited by asking them to participate in a study entitled "Psychedelics." It may be that subjects interested in drug use tended to participate more frequently in this study, whereas Barter and Berg present the results of systematic samplings.

Cross-Validation of the DUS

It will be recalled that only one correlation coefficient, that reflecting the relationship between Nature and Experience items, changed significantly ($p > .05$) during the first cross-validation. Similarly, little change occurred in the magnitude of the correlations among subtests and their parts calculated for the 76 item, final version of the scale and its original version.

Although the original item pool was somewhat large, approximately half of the items were deleted. Apparently this was not too substantial a decrease in number of items. Approximately 100 subjects were used during both cross-validation procedures and therefore, since smaller groups of subjects yield large sampling errors, there is reason to believe that both cross-validations were exposed to the same amount of sampling errors. In conclusion the results of cross-validation suggest that the internal validity coefficients of the scale are not spuriously high.

Limitations of the Present Investigation

Apparently the Knowledge subtest and its parts were more susceptable to uncontrolled error variance for they obtained lower reliability than

the other parts of the DUS. Therefore, the Knowledge subtests should be used cautiously in situations where decisions are made on the basis of fine discriminations between scores. Data is lacking regarding the scale's external validity. Also, until norms are gathered on individuals from other college campuses or high schools the degree to which the scale is applicable to students other than those who attend Southern Illinois University remains unknown. Finally, the scale should be administered in its shortened form to ensure that the removal of inadequate items and slight modification of instructions does not influence the way subjects respond to the scale and therefore affect its reliability and validity. This task is at present being implemented.

Applications of the DUS

The applicability of the DUS resides primarily in the fact that it is basically a psychometrically sound instrument which gives the investigator a fairly thorough look at drug-using behavior. The rationale upon which the scale was developed took into account many aspects of the multifaceted phenomenon of drug use. The DUS has potential for use in any investigation exploring drug usage because it provides a good estimate of drug-using behavior.

An area which the author would like to see the scale initially used is that of drug education. A most frequent approach to drug education has been the dissemination of information about the effects of drugs. Regardless of the validity of this information, frequently implicit in this approach is the assumption that all individuals benefit from a similar type of educational program and that all individuals may benefit from drug education. Before an effective drug education program can be

initiated one must possess some understanding of the needs and the characteristics of the sample with which he is dealing. The DUS may be used to provide this type of information.

Although attitudes toward drugs, experience with drugs, and knowledge about drugs do vary together to a statistically significant degree they do not relate to each other perfectly. Conceivable there are some individuals who hold positive attitudes toward drugs but who have had no experience with them and who know little about their effects. Similarly, one might identify a group of individuals who also hold positive attitudes, have no drug experience, and who know a lot about drug effects. This former group may be viewed as greater "risks" for if they initiate drug use, because of their low knowledge, they are more likely to have potential bad experience than would the latter, knowledgable group. Certainly these two groups should be treated differently. It is all too frequent that drug education programs are implemented without prior detailed consideration of the sample to which the program is directed. It is believed that the DUS may be helpful in providing a sound rationale from which an education program may develop.

References

Allen, J.R., & West, L.J. Flight from violence: Hippies and the green rebellion. American Journal of Psychiatry, 1968, 125(3), 304-310.

Althoff, M.E. Repression-sensitization, sensation-seeking, and psychedelics, Unpublished manuscript, Southern Illinois University, 1968.

Althoff, M.E. The development of a test to assess drug-using behavior, Unpublised Masters Thesis, Southern Illinois University, 1971.

Anastasi, A. Psychological testing (3rd Ed.). New York: The Macmillan Co., 1968.

Barter, J.Y. Epidemiology of drug use among college students in the Denver Metropolitan area. Symposium presented at the alcohol and drug use research among insiders and outsiders, Albuquerque, New Mexico, May, 1969.

Berg, D.F. The nonmedical use of dangerous drugs in the United States: A comprehensive view. International Journal of the Addictions, 1970, 5(4), 777-834.

Blum, R.H., & Associates. Students and drugs. SanFrancisco: Jossey-Bass Publishing Co., 1969.

Eddy, N.F., Halback, H., Isbell, H., & Seevers, M.H. Drug dependence: Its significance and characteristics. Bulletin of the World Health Organization, 1965, 32, 721-733.

Eells, K. Marijuana and LSD: A survey of one college campus. Journal of Counseling Psychology, 1968,15(5), 459-467.

Fiske, D.W. Homogeneity and variation in measuring personality. American Psychologist, 1963, 18, 643-652.

Fiske, D.W. Some hypotheses concerning test adequacy. Educational and Psychological Measurement, 1966, 26, 69-88.

Gronek, T. & Tyler, T.A. ANLITH: Item, test, and homogeneity analysis, and data scoring program--360/50, Southern Illinois University, 1970.

Guilford, J.P. Psychometric methods. New York: McGraw-Hill, 1954.

McGlothlin, W.H., & Cohen, S. The use of hallucinogenic drugs among college students. American Journal of Psychiatry, 122(5), 572-574.

Modell, W. Mass drug catastrophes and the roles of science and technology. Science, 1967, 156, 346.

Nunnally, J.C. Psychometric theory. New York: McGraw-Hill Book Co., 1967.

Tyler, T.A. Intervening processes in responding to test items. Unpublished manuscript, University of Chicago, 1965.

TABLE 1

Mean, Standard Deviation (S.D.), Indices of Internal Consistency, and Test-Retest (T-R) Correlations of Subtests and Subtest Parts for Winter Administration

Subtests and Subtest Parts	Variables					
	Mean	S.D.	T-R	Rtt	Rii	Rpp
Attitudes	337.18	93.70	.91	.98	.32	.34
Part 1	300.77	86.71	.91	.98	.32	.33
Part 2	36.41	9.08	.88	.88	.42	.31
Experience	138.28	269.05	.77	.54	.02	.07
Variety	20.19	3.76	.98	.91	.36	.28
Nature	33.07	27.81	.96	.97	.65	.28
Extent	85.02	254.11	.75	.51	.06	.07
Knowledge	12.13	4.19	.88	.78	.14	.13
Factual	5.68	2.04	.76	.55	.11	.16
Social	6.44	2.59	.82	.70	.18	.11

[a]Six male and two female subjects failed to participate in the second administration of the scale, hence test-retest coefficients are calculated on a total of 96 subjects.

TABLE 2

Product-Moment Correlations Among Subtests and Subtest Parts for Winter Administration

	Subtests and Subtest Parts	1	2	3	4	5	6	7	8	9
1	Attitudes									
2	Part 1	.99								
3	Part 2	.79	.75							
4	Experience	.40	.39	.35						
5	Variety	.68	.67	.60	.60					
6	Nature	.71	.69	.74	.51	.89				
7	Extent	.33	.33	.28	.99	.52	.41			
8	Knowledge	.43	.41	.49	.30	.48	.49	.26		
9	Factual	.30	.29	.38	.17	.28	.31	.15	.88	
10	Social	.45	.44	.49	.36	.55	.54	.31	.93	.64

Note.-All coefficients whose values are greater than .16 and .23 are significant, respectively, at the .05 and .01 levels.

TABLE 3

t-Values and Point-Biserial Correlation Coefficients of Subtest and Subtest Parts for Users and Nonusers

Subtests and Subtest Parts	t	r_{pb}
Attitudes	6.77	.55
Part 1	5.95	.51
Part 2	9.49	.69
Marijuana	7.59	.60
Hallucinogens	5.88	.50
Stimulants	5.29	.46
Depressants	4.62	.42
Opiates	3.19	.30
Knowledge	3.99	.37
Factual	2.21	.21
Social	4.64	.42

Note.-All *t* values and *r*'s are significant at the .01 level (d.f.=102) with the exception of Factual Knowledge which reached significance only at the .05 level.

TABLE 4

Mean and Standard Deviation for Subtests and Subtest Parts Divided with Respect to Drug Class, Sex and Use or Nonuse of Drugs

Subtests and Subtest Parts	Mean Score				Standard Deviation			
	MU	MNU	FU	FNU	MU	MNU	FU	FNU
Attitudes	383.92	239.12	362.90	284.50	86.15	55.82	74.14	68.23
Part 1	342.17	213.12	323.28	255.22	81.28	53.84	69.99	64.72
Part 2	41.75	25.94	39.62	29.28	6.89	5.71	6.63	5.89
Marijuana	89.33	49.35	85.41	66.11	18.24	13.68	16.26	19.43
Haliucinogens	75.77	41.82	65.41	49.22	23.19	13.54	20.08	14.41
Stimulants	66.80	43.35	67.07	52.39	18.20	11.95	16.70	14.47
Depressants	59.67	41.47	58.28	47.22	18.23	9.53	13.52	11.27
Opiates	50.60	37.18	47.10	40.28	17.91	10.18	13.79	13.49
Experience	242.80	---	140.48	---	361.10	---	216.62	---
Variety	22.67	---	20.62	---	4.13	---	2.50	---
Marijuana	158.17	---	79.59	---	340.06	---	200.27	---
Hallucinogens	16.05	---	12.14	---	13.98	---	19.78	---
Stimulants	18.63	---	12.76	---	23.09	---	9.22	---
Depressants	19.93	---	9.86	---	40.63	---	11.54	---
Opiates	7.35	---	5.52	---	5.91	---	2.79	---
Knowledge	14.40	9.88	11.69	9.89	4.19	3.31	3.67	3.02
Factual	6.32	4.88	5.62	5.11	2.16	1.81	1.87	1.76
Social	8.07	5.00	6.07	4.78	2.40	1.97	2.26	1.78

Note.-The notations MU, MNU, FU, and FNU refer, respectively, to male drug users, male nonusers, female drug users, and female nonusers.

Footnotes

Page 1:

[1]This paper is based on a master's thesis at Southern Illinois University under the direction of Stanley L. Brodsky, Thomas A. Tyler, and Clayton E. Ladd. The author wishes to gratefully acknowledge the many suggestions and valuable criticisms which these men provided. In addition, appreciation is extended to James A. Clark for his help in the final preparation of this report.

[2] Requests for reprints should be sent to the author at the following address: Department of Psychology, Southern Illinois University, Carbondale, Illinois 62901.

Page 2:

*Copies of the scale and extended tabular presentation of the results are available from the author.

Page 7:

*Items reported on are those remaining subsequent to both cross-validations.